

This worksheet is intended to remind you of the work you completed during the last 3 weeks. There will be a short test in your next lesson covering all this work.

Reminders: The Language of Algebra (LOA)

A group of letters and numbers within an expression is called a term

The number in the term $-6xy$ is called a coefficient

The letter in the term $-7a$ is called a pronumeral

$7abc$ and $6bca$ are called like terms.

The expression $7x + 5y + 3x - 6y$ can be simplified to $9x - y$

When like terms appear in an expression, they can be 'collected' (added or subtracted)

When working on worded problems, you are trying to convert English 'sentences' into algebraic ones.

We can evaluate (or work out) an algebraic expression if we substitute the pronumerals with their known values.

Expansion, in algebra, means to multiply everything inside the bracket by what is outside.

The acronym FOIL stands for the words **First, Outsides, insides Lasts**,

Drawing a diagram is an excellent aid in problem solving.

(pronumeral)	(problem)	(outer)	(simplified)	(term)	(like)	(worded problems)		
(first)	(coefficient)	$(10x - y)$	(like)	(inside)	(last)	(terms)	(inner)	(substitute)

Converting worded questions into algebraic expressions

Write each of the following as a mathematical sentence.

- The sum of a and b $a + b$
- The product of 3 and g $3 \times g$
- The difference between 15 and h $15 - h$
- 2 times x is subtracted from 5 times y $5y - 2x$
- A piece of rope is 24 metres long. George cuts k metres off. How much is left? Left = $24 - k$

Substitution (means 'replacing')

If $y = 5x^2 + 2x - 1$, what does y equal if $x = 2$? $y = 5 \times (2^2) + 2 \times 2 - 1$ [$y = 23$]

If $y = 5x^2 - 2x - 9$, what does y equal if $x = -2$? $y = 7$

Simplifying (means 'add or subtract any like terms')

- $5y + 2y = 7y$
- $-9p + 3p = -6p$
- $2y - 5y + y = -2y$

d) $8ab + 2a^2b^2 - 5a^2b^2 + 7ab =$ _____ e) $n^2 - p^2q - 3p^2q + 6 + 4pq^2 =$ _____

Expanding

(Remember that there is a \times sign between the number out the front and the bracket & take care with the signs!!)

a) $5(x + 3) =$ $5x + 15$ b) $-4m(2m + 1) =$ $-8m^2 - 4m$

c) $-5(m - 2) =$ $-5m + 10$ d) $x(2x - 3y) =$ $2x^2 - 3xy$

Find the errors (if there are any??)!!

a) $5(x - 1) = 5x - 1$ _____ -5

b) $2(x + 3) = 2x + 5$ _____ $10x + 6$

c) $8x - 3x = 5$ _____ $5x$

d) $-2(x - 7) = -2x + 14$ _____

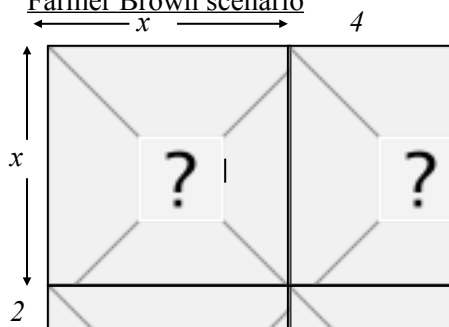
e) $x(x + 5) = 2x + 5x$ _____ $x^2 + 5x$

Expanding – requiring a little more effort

a) $3(a + 2b) + 2(3a + b) = 3a + 2b + 6a + 2b = 9a + 4b$

b) $7p - 2 - 3(3p + 4) = 7p - 2 - 9p - 12 = 7p - 9p - 2 - 12 = -2p - 14$

Farmer Brown scenario



Area of square with side x

x^2

Area of rectangle with dimensions 2 and x

$2x$

Area of rectangle with dimensions 4 and x

$4x$

Area of rectangle with dimensions 2 and 4

8

Total Area

$x^2 + 6x + 8$

Expanding Double brackets using FOIL

a) $(a + 2)(a + 3)$

b) $(n - 3)(n - 1)$

c) $(p - 2)(p - 3)$

d) $(3m + 1)(4m - 5)$

$a^2 + 5a + 6$

$n^2 - 4n + 3$

$p^2 - 5p + 6$

$12m^2 + 11m - 5$

Special Patterns

Explain how and why you can 'short-cut' the FOIL process when expanding this expression: $(k + 5)(k - 5)$

_____DOTS- square the first term , minus, square the second term_____

Explain how and why you can 'short-cut' the FOIL process when expanding this expression: $(r + 4)^2$

_____Perfect square - Square the first term multiply both terms in the bracket and double it and add the square of the last term_____

Harder 'Expand & Simplify' questions (ACTUALLY, not harder!! Just longer!!)

Expand and simplify $(x + 2)(x + 7) + (x + 4)(x + 1)$

$$x^2 + 9x + 14 + x^2 + 5x + 4$$

$$= 2x^2 + 14x + 18$$

Expand and simplify $(x + 6)(x + 2) - (x + 3)(x - 1)$

$$x^2 + 8x + 12 - [x^2 + 2x - 3] \text{ (multiply all in brackets by - minus)}$$

$$\mathbf{6x + 15}$$

And an application question

A pool is surrounded by a deck. The deck has the same width (x metres) all the way around.

The swimming pool has a length of $(2x + 3)$ metres and a width of $(x - 1)$ metres. It is quite deep.

a) Draw a diagram of the pool surrounded by the deck. Label the length and width of the pool.

b) In terms of x , what is the length of the deck?

- c) In terms of x , what is the width of the deck?

- d) Work out what the area of the decking is, in terms of x .
- e) If the width of the decking is 1.3 metres wide, what is the area of the decking?
- f) If the decking cost \$33 per square metre to build, how much would the decking have cost ?